DETERMINATION OF MONTHS OF MAXIMUM EFFECTIVENESS FOR CERTAIN FACTORS AFFECTING WHEAT PRICES ON THE KANSAS CITY MARKET

by

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INTRODUCTION

Each year, regardless of the price of wheat at harvest time or the general price level, there is always the problem of determining the best time to sell wheat that is stored. There are a great many factors affecting wheat prices and there are always sure to be a great many seasonal fluctuations in prices.

The extent and variation of these fluctuations in seasonal prices depends largely upon the changes in the various price making factors from one year to another. The crops and exports from competing countries may be large or small, commodity prices may go up or down and visible supplies may be increased or decreased, depending on certain conditions.

Of course, each of these factors may add to or offset the effect of any of the others, but for each there is a period within the year when its greatest influence is exerted. It is not to be expected, for instance, that Canadian production would be as important a factor in September or October as it is in November and December, during the time of heaviest marketing.

Over a period of 34 years the Kansas City market has had three seasonal "strong spots" and three seasonal "weal spots" and each of these "strong spots" and "weak spots" is pretty definitely associated with one or more of the factors studied. (See Fig. 1, Appendix) It is important, therefore, in watching for and gauging the size of these seasonal price changes to know in what months each of the most commonly recognized price making factors exerts its greatest influence.

REVIEW OF LITERATURE

Several previous studies have been made showing or recognizing the relationship of each of the factors studied to prices.

Hammatt/1 points out that during the period from 1922-23 to 1925-26, whenever the world crop increased, as compared with the crop the year before, the price fell; and whenever the crop decreased, as compared with the crop the year before, the price advanced.

Murray/2 made a similar study for corn but used absolute figures rather than relative figures. In a discussion on corn prices before the Chicago Chapter of the American Statistical Association he said, "The volume of production

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1. Hammatt, Theodore D. Factors in Wheat Marketing. 1927. The United States Department of Commerce.
2. Murray, Nat C. Forecasting Corn Prices.

as we all know, is the most influential factor on price, but season's supply, that is, the production plus the carryover, is of greater influence. Thus, the correlation ratio between production and price of May futures at Chicago for the past eight years without removal of trend is -.905, carryover and price is -.5̶53, using production and carryover it is -.952, a very high correlation."

In Extension Bulletin No. 54, 1925,/3 published by the Kansas State College of Agriculture and Applied Science, production in the five leading wheat producing countries is given as an important factor in causing the seasonal weak and strong spots in the Kansas City market. The production of each country is considered to have its greatest effect at the time when its wheat is harvested and marketed. Attention is called to the fact that the three possible weak spots in Kansas City wheat prices occur at those seasons of the year when farmers in some important wheat producing countries are marketing their wheat the heaviest, and the three possible strong spots come at those times during the year when wheat supplies from competitor countries are light.

Timoshenko/4 studied production factors and also in-

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3. Kansas State College of Agriculture and Applied Science. 1925. Extension Bulletin No. 54.

4. Timoshenko, Vladimir. The Role of Agricultural Fluctuations in the Business Cycle. 1930.

dustrial prices in their relationship to prices of agricultural commodities. He found that from the period 1867 to 1914 there was a correlation of -.734 between the volume of all crops and their prices. From his study of the relation of agricultural to industrial prices the following are some of his conclusions: "1. A low ratio of agricultural to industrial prices generally precedes or is coincident with a business revival; a high ratio very often occurs during periods of great prosperity or financial stringency and precedes, or is coincident with a recession. These facts indicate that business cycles may be caused, in part, by cycles in the ratio of agricultural to industrial prices. 2. A comparison of business annals with the fluctuations of several indexes of agricultural activity, (such as the index of the volume of crops, the ratio of agricultural to industrial prices, and the index of agricultural exports) demonstrates the dependence of the business cycle upon agricultural factors. 3. Cycles in the physical volume of crops generate cycles in crop prices. These cycles in crop prices, though related in some measure to cycles in industrial prices, are not entirely coincident with them. Consequently, the ratio of agricultural to industrial prices also reveals cyclical fluctuations. 4. The role of agricultural fluctuations as the direct or indirect cause of the business cycle in the country has been of great importance, especially during the forty years before the World War."

The United States Department of Agriculture, Bureau of Agricultural Economics, issued the following statement in a pamphlet published in July 1930./5 "In the past 10 months wheat prices have fallen faster than the general price level as they did in the depression of 1920. Any marked decline in the general price level is likely to be accompanied by a decline in wheat prices unless the supply of wheat becomes quite short in the face of a general price depression. In 1924 a short world crop followed by a short crop in the United States in 1925 resulted in two seasons of relatively high prices for wheat, but these two seasons have been followed by successively larger world crops and increasing carryovers until 1929. Large wheat stocks and the decline in the general price level more than offset the influence of the world crop reduction in 1929."

No studies were found dealing with the effect of exports, visible supply, or condition of the growing crops but these factors are generally accepted by writers on

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5. Wheat Facts. The United States Department of Agriculture. Bureau of Agricultural Economics.

wheat prices and the grain trade./6, /7, /8

PURPOSE OF STUDY

This study has been made with the purpose of determining the months of maximum effectiveness of certain price making factors on the price of wheat at Kansas City. The factors studied were: 1. Kansas production; 2. The United States spring wheat production; 3. Canadian production; 4. Argentine plus Australian production; 5. Exports from competing countries; 6. Canadian exports; 7. Commodity prices; 8. The United States visible supply; 9. The condition of the growing crop.

Production and export factors are generally considered by the grain trade to have their greatest seasonal effect at times when they are most in evidence. Kansas production is considered the principal cause of the seasonal "weak spot" in June to September; Canadian production and Canadian exports the principal causes of the seasonal "weak spot" in November and December; and Argentine plus Australian production the principal cause of the seasonal "weak spot" in February to March. The United States spring

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6. Stanford University of California. Wheat Studies of the Food Research Institute. 1928-30.

7. Hammatt, Theo. D. Bureau of Foreign and Domestic Commerce. Factors in Wheat Marketing. 1927.

8. Green, R. M. and Stokdyk, E. A. Judging Price Risks in Marketing Wheat. 1927.

wheat crop and the exports from the competing countries of Canada, Australia, India, Argentina, and Russia are considered to be the most important factors affecting the seasonal "strong spot" in September and October; Canadian exports and exports from competing countries are considered the most important factors affecting the seasonal "strong spot" in January; and spring mill buying, condition of the growing crop, and the lack of heavy marketing are considered the most important factors affecting the "strong spot" in April and May. Commodity prices and the United States visible supply are expected to exert their greatest seasonal influence from April to June when other factors are less in evidence.

This study measures the effect of the variation in importance of these various factors from year to year and attempts to determine the periods at which each factor has its greatest effect on the general price level of wheat. With many of the factors the seasonal influence and the influence on the price level caused by a variation in the importance of the factor come at the same time.

The information obtained should be of value in forecasting by determining in which months to expect the greatest effect from the factors studied. For example, if Canada has a short crop or a large crop, at what time will this factor have the largest influence on prices in Kansas

City?

METHOD OF PROCEDURE

The prices taken were top prices by months for No. 2 hard winter wheat at Kansas City as compiled from the Kansas City Grain Review. Data for production factors, the United States visible supply, and condition of the growing crop were taken from the 1930 Year Book of the United States Department of Agriculture. Data for export factors were taken from the Chicago Board of Trade Year Books. Correlations were worked out between the various factors and price for the 21-year period from 1910 to 1930 inclusive, and for a 16-year period from 1915 to 1930 inclusive (with the exception of commodity prices). In the 21-year period there was a large increase in both prices and production due to increased demand and price inflation caused by the World War and for that reason the 16-year period is considered more satisfactory. A sufficient number of months are used in each case to measure the greatest effectiveness within the crop year beginning July 1 and ending June 30. The degree of effectiveness as between months is determined by a comparison of the coefficients of correlation. The larger the coefficient of correlation the greater the effectiveness indicated and in most cases the reliability of results is supported by other evidence. Without supporting evidence the size of some of the coefficients obtained would be too small to have much significance, but it is impossible to fully eliminate the influence of all other factors acting at the same time.

The central theme of the study is not the net quantitative effect of each factor but the time of highest correlation between the factor and price.

THE KANSAS CROP

During the period from 1910 to 1930 inclusive, the size of the Kansas crop varied from 41 million bushels in 1917 to 181 million bushels in 1914. Prices were taken from July 1910 to June 1931 inclusive and varied from 73 cents a bushel in February 1931 to $3.42 a bushel in May 1917.

Harvesting of the Kansas crop comes mostly in June and July and marketing is heaviest during July, August, and September. From 1909 to 1925, 17.08 per cent of the Kansas wheat crop was marketed in July, 18.42 per cent in August, and 11.48 per cent in September, making approximately 47 per cent for these three months. Since the introduction of the combine there has been a shifting of marketing to the earlier months of this period.

This heavy marketing occurs during the first "weak spot" or from June to September and is considered by the grain trade as the most important factor causing the weak spot. This is true because Kansas production is the largest in the southwest and other southwest production is marketed along with it.

Coefficients of correlation between price and production were worked out for each month of the year, first for the 21-year period from 1910-11 to 1930-31 inclusive and later for a 16-year period from 1915-16 to 1930-31 inclusive.

Table I shows the coefficients obtained for each month and for each of the two periods. It will be noted that somewhat higher negative correlations were obtained for the 16-year period than for the 21-year period. This is accounted for by the fact that, in 1915, there was a large shift in price levels, due to the World War, which acted as a stimulus to Kansas production. Prices and production both increased rapidly. For the first five years Kansas production averaged 91 million bushels and for the last 16 years the production averaged 119 million bushels. For the first five years, prices in July, averaged $1.00 per bushel but for the last 16 years prices averaged $1.77 per bushel. For 21 years to be as satisfactory as 16 years, the secular trend would have to be removed.

Table I.— The correlation of Kansas wheat production to Kansas City price of No. 2 hard winter wheat.

Month	21 Years	16 Years
July	+.02	-.20
August	-.04	-.35
September	+.06	-.10
October	+.013	-.25
November	+.04	-.20
December	+.06	-.20
January	+.08	-.20
February	+.12	-.23
March	+.03	-.27
April	+.0001	-.30
May	+.02	-.26
June	+.01	-.29

The months of highest negative correlation are August, April, June, March, and May, in the order named. The coefficients for these months are not high but are supplemented with other evidence that tends to increase the reliability.

Figure 1 shows the relationship of these points of maximum effectiveness to the seasonal price fluctuations in the wheat market at Kansas City.

THE UNITED STATES SPRING WHEAT CROP

The period from September to October is one of the seasonal "strong spots" when there is a tendency for the price of wheat in Kansas City to advance. During September

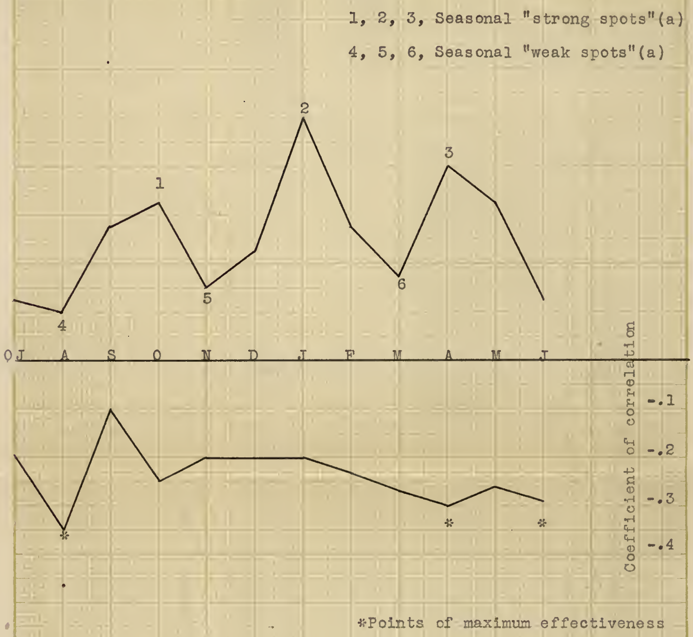

Figure 1.— Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for Kansas production.

(a) See Fig. 1, Appendix.

there is a slackening up of the marketing of the winter wheat crop and a decline in exports from competing countries. These conditions are both favorable for a price advance at this time. The United States spring wheat crop is considered an important factor in tending to check this advance.

The size of the United States spring wheat crop during the period from 1910 to 1930 inclusive has varied from 156 million bushels in 1916 to 356 million bushels in 1918, or a difference of 200 million bushels between the smallest crop and the largest crop. The average for the first five years was 233 million bushels and for the last 16 years was 258 million bushels. Somewhat higher correlations were obtained by using 16 years than by using the entire 21 years as shown in Table II. Of the fall months, September has the highest negative correlation, October next, and November third. May has the highest correlation of the spring months and July of the following year has a higher correlation then any month of the corresponding year.

Figure 2 shows the relationship of points of maximum effectiveness to the seasonal price changes in the Kansas City market.

Table II.— The relation of the United States spring wheat crop to the Kansas City price of No. 2 hard winter wheat.

Month	21 Years	16 Years
August	+.02	-.09
September	-.06	-.28
October	-.04	-.20
November	-.07	-.19
December	-.004	-.09
January	-.005	-.07
February	+.005	-.07
March	-.03	-.09
April	-.09	-.15
May	-.16	-.27
June	+.013	-.16
July (Following July)	-.11	-.35

THE CANADIAN CROP

From 1910 to 1930 inclusive, Canadian production varied from 132 million bushels in 1910 to 567 million bushels in 1928, or a difference of 435 million bushels between the two extremes. During the first five years the average production was 196 million bushels and for the last 16 years it was 345 million bushels. The increase in the size of the coefficient of correlation for the 16-year period over the 21-year period is due not only to getting away from the shift in both prices and production taking

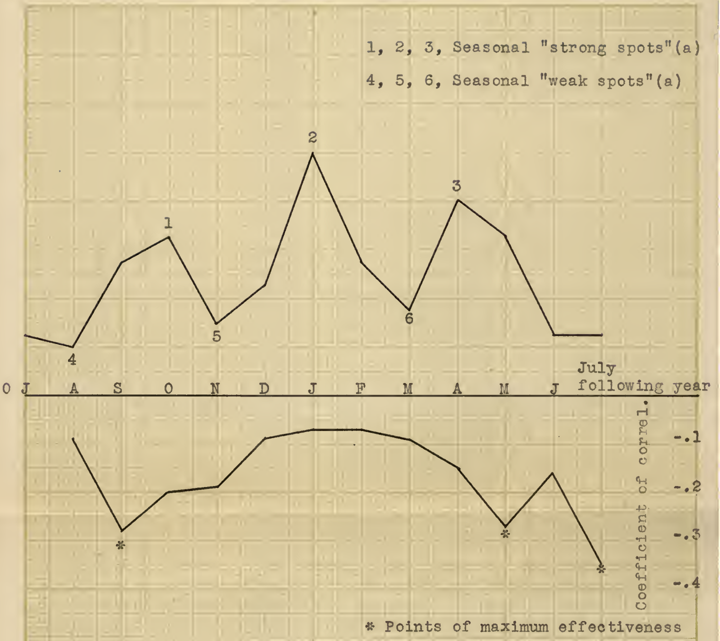

Figure 2.— Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for the United States spring wheat crop.

(a) See Fig. 1, Appendix.

place in 1915, but also to the increase in importance of the Canadian crop.

The greatest activity in harvesting and marketing of the Canadian crop takes place during the period of the weak spot from November to December. From that time on marketing is less but it is an important factor at all times.

Table No. III shows the highest coefficient of correlation in December and the next highest in October and March.

Table III.— The relation of the Canadian crop to the price of wheat on the Kansas City market.

Month	21 Years	16 Years
July	-	-
August	-	-
September	-.18	-.65
October	-.17	-.69
November	-.19	-.68
December	-.26	-.78
January	-.20	-.65
February	-.23	-.68
March	-.25	-.69
April	-.22	-.60
May	-.25	-.63
June	-.065	-.60

Figure 3 shows the relation of points of maximum effectiveness to the seasonal price fluctuations in Kansas City prices.

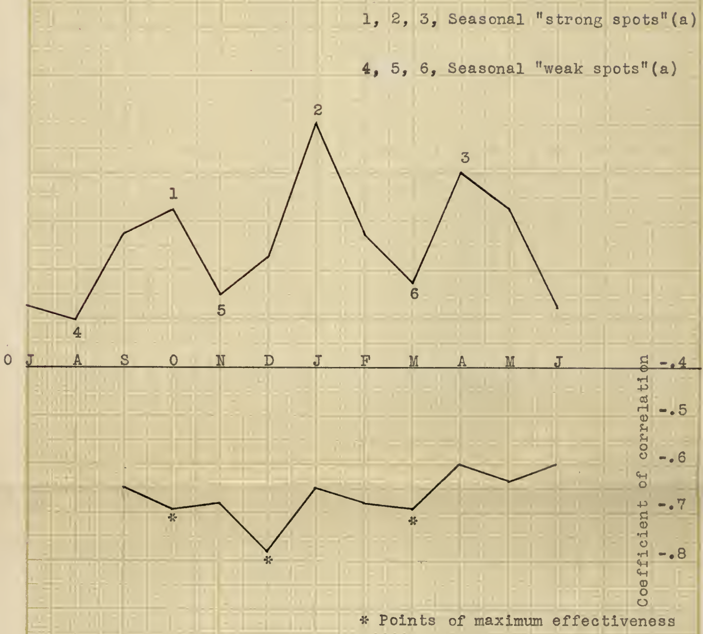

Figure 3.— Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for Canadian production.

(a) See Fig. 1, Appendix.

THE ARGENTINE PLUS AUSTRALIAN PRODUCTION

The combined production of Argentina and Australia varied from 194 million bushels in 1914 to 486 million bushels in 1930, a difference of 292 million bushels between the largest and the smallest crops. The average for the first five years studied was 232 million bushels and for the last 16 years was 334 million bushels.

Harvest in Argentina and Australia begins in December and January and the marketing reaches its peak in February or March. The greatest seasonal effect is expected to occur in February and March, during the "weak spot" occurring at that time but the coefficients of correlation obtained show that the effect increases as the season advances and reaches its highest in May. It is possible that this effect on the seasonal change in price comes a little later than the period of heaviest marketing because Argentina puts much wheat afloat unsold for want of storage room and it has its greatest effects on price when it begins to pile up in importing countries.

Table No. IV shows the coefficients of correlation between the combined production of these two countries and prices of wheat at Kansas City for 21 years and for 16 years.

Table IV.—The relation of Argentine plus Australian production to Kansas City wheat prices.

Months	21 Years	16 Years
July	-	-
August	-	-
September	-	-
October	-	-
November	-.01	-.50
December	-.11	-.64
January	-.16	-.64
February	-.20	-.67
March	-.21	-.68
April	-.26	-.72
May	-.28	-.74
June	-.06	-.69

Figure 4 shows the relation of points of maximum effectiveness to the seasonal fluctuations in the Kansas City price.

CANADIAN EXPORTS

Table V shows a comparison of Canadian exports for the first five years of the period studied with the exports of the last 16 years of the same period. It also shows distribution of exports by months which is approximately the same for the two periods though the totals are different. Exports are highest in October, November, and December, and lowest in January and February. March shows an increase

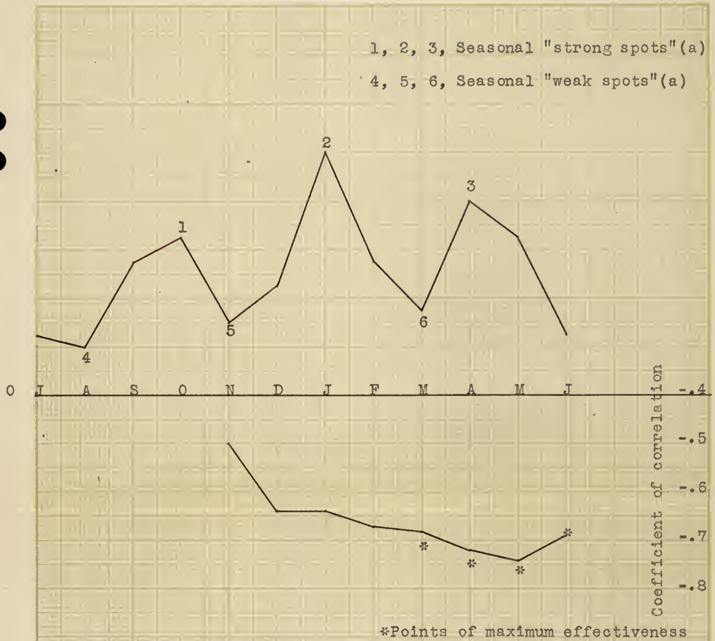

Figure 4.—Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for Argentine plus Australian production.

(a) See Fig. 1, Appendix.

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over January and February and is also higher than in April but the main pick-up in the spring is in May with the opening of the Great Lakes to navigation.

Table V.— Average monthly exports from Canada, 1910 to 1930 inclusive.

Month	1910 to 1914 5 year average	1915 to 1930 16 year average
July	5.1	12.4
August	4.2	10.9
September	3.3	10.3
October	10.3	23.5
November	14.7	35.0
December	13.1	33.6
January	2.8	9.5
February	2.4	7.9
March	4.9	9.7
April	4.2	6.2
May	8.3	17.7
June	5.8	16.1

Table VI shows the coefficients of correlation obtained for a 21-year period and for a 16-year period. It is interesting to note how the months of maximum and minimum effectiveness correspond to the months of greatest and least exports. In October, the month of highest correlation, the average exports are less than for November and December but the increase of October over September is much greater than the increase of the other months over the preceding month. Also many of the export sales of each month are made in the preceding month.

Table VI.— The relation of Canadian exports to Kansas City prices by months.

Month	21 Years	16 Years
July	-.16	-.47
August	+.000	-.45
September	-.13	-.50
October	-.27	-.73
November	-.20	-.60
December	-.08	-.49
January	+.16	+.27
February	-.13	-.34
March	-.10	-.46
April	-.27	-.43
May	-.09	-.38
June	-.056	-.44

Figure 5 shows the relationship of Canadian exports to the strong points and weak points of the Kansas City market. They are most important in influencing the "strong spot" in September and October and least important in influencing the "strong spot" in January.

EXPORTS FROM COMPETING COUNTRIES

For this study the combined total exports from Canada, Argentina, Australia, India, and Russia, the five principal competing countries, were used. A study of Table VII shows that the average for the five-year period from 1910 to 1914 inclusive was nearly the same as for the 16-year period from 1915 to 1930 inclusive. In fact, the averages

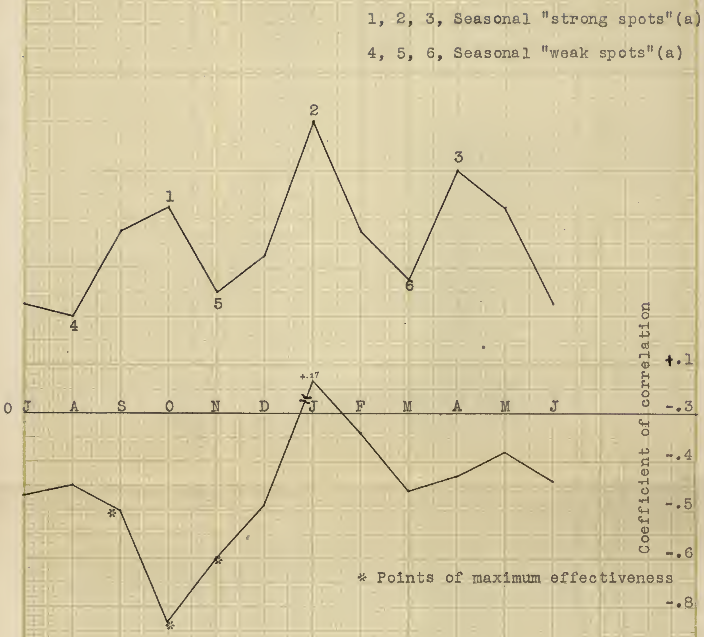

Figure 5.—Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for the Canadian exports.

(a) See Fig. 1, Appendix.

for August, September, February, March, and April were larger for the five years than for the 16 years.

For the 16 years, the period from which conclusions were drawn, the high months for exports were the same as for Canada, being October, November and December. October, however, is the highest of the three. January shows a decided falling off of exports and is the lowest month of the year. This is due to the decided dropping off of Canadian exports at this time.

Table VII.— The average monthly exports from competing countries, 1910 to 1930.(In millions of bushels)

Month	1910 to 1914 5 year average	1915 to 1930 16 year average
July	28.0	29.0
August	26.2	22.7
September	27.3	20.8
October	35.2	45.2
November	32.7	43.3
December	26.7	44.6
January	26.3	29.6
February	34.7	33.0
March	42.1	36.2
April	38.1	31.7
May	39.5	39.7
June	33.0	37.4

Table VIII shows that the coefficients of correlation for the 21 years and for the 16 years are practically the same, being higher for part of the months in the 21-year period. The results differ in this respect from the results obtained with other production and export factors studied, and this is due no doubt to the fact that the combined exports were fairly constant for the entire period from 1910 to 1930.

For the fall and winter months the coefficient of correlation is highest in October, next highest in November, and third in December, corresponding identically to the months of highest exports. January the month of lowest exports shows little or no correlation. October shows the highest correlation of any month of the year.

The coefficients for July, August, September, and May are comparatively small, indicating either that exports are of less importance for those months or that other factors are of much greater importance.

Table VIII. Relation of exports from competing countries and price of No. 2 hard winter wheat at Kansas City.

Month	21 Years	16 Years
July	-.075	-.18
August	-.10	-.15
September	-.34	-.27
October	-.36	-.59
November	-.22	-.43
December	-.06	-.41
January	+.07	+.03
February	-.24	-.30
March	-.40	-.40
April	-.44	-.42
May	-.30	-.27
June	-.19	-.41

Figure 6 shows the relationship of points of maximum effectiveness and the seasonal changes in Kansas City prices.

WHOLESALE COMMODITY PRICES

Wholesale commodity prices were taken from the United States Bureau of Labor index and because of the high correlations obtained for 21 years, the 16-year period was not studied. Also because both factors have to do with prices and are largely influenced by the same external conditions.

Table IX shows that the coefficients of correlation are slightly higher for the summer and fall months, corresponding to the months of heaviest mill grinding.

This is the only factor studied on the demand side and is the only factor showing consistent plus correlations. The closeness of relationship corresponds very closely with the results of the other studies on relation of wheat prices to commodity prices. (See Fig. 2, Appendix) The trend of commodity prices in general is particularly important in affecting mill buying which is usually most active in September and October and again in the spring in about May.

Figure 7 shows the relation of points of maximum effectiveness to the seasonal price changes in Kansas City.

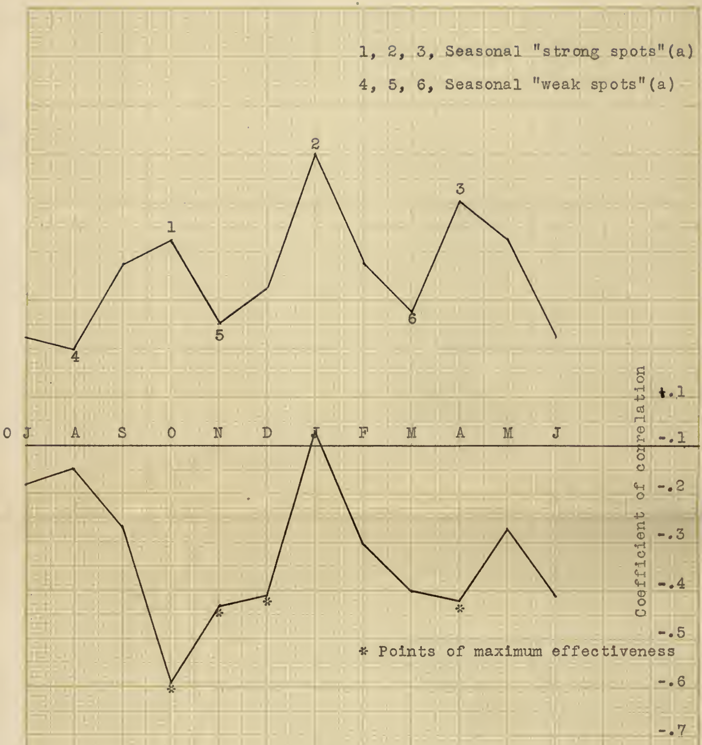

Figure 6.—Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for exports from competing countries.

(a) See Fig. 1, Appendix.

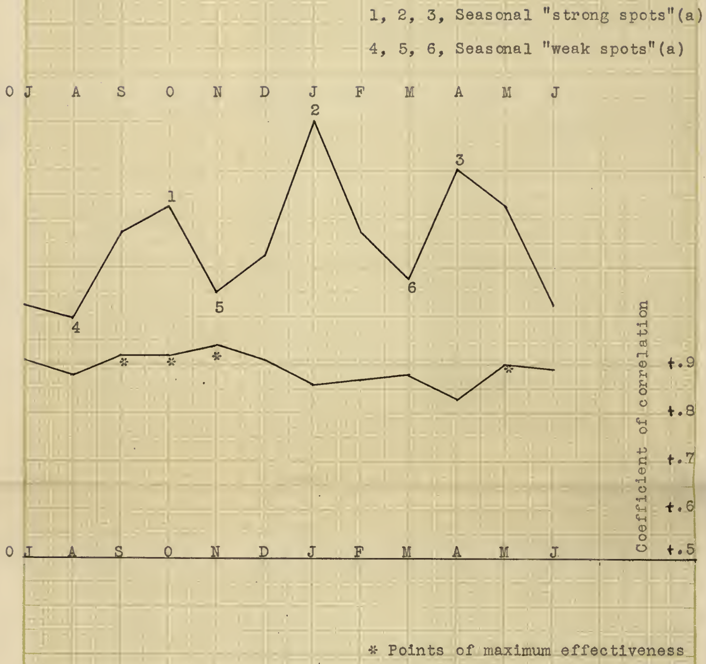

Figure 7.—Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for wholesale commodity prices.

(a) See Fig. 1, Appendix.

Table IX.—Relation of wholesale commodity prices to Kansas City wheat prices.

Months	21 Years
July	+.91
August	+.88
September	+.92
October	+.92
November	+.94
December	+.91
January	+.86
February	+.87
March	+.88
April	+.83
May	+.90
June	+.89

CONDITION OF THE GROWING CROP

Only two months of each year were studied with this factor. These two months come just preceding the harvesting of the Kansas crop. During other months of the year the condition of the growing crop is considered but with less importance attached.

Table X shows a negative correlation for May, but a slight positive correlation for June. May is probably more sensitive, due to the fact that May futures are closed out at this time. This may cause an exaggerated effect in May that results in an opposite reaction in June.

Table X.— The relation of the condition of the growing crop to Kansas City prices.

Month	21 Years	16 Years
May	-.33	-.51
June	-.04	+.20

THE UNITED STATES VISIBLE SUPPLY

Table XI shows that the United States visible supply for the period studied averaged the lowest in July and from that time on gradually increased until a peak was reached in December. After December there was a continuous decrease until the next July.

Table XI.— The average United States visible supply by months, 1910 to 1930. (In millions of bushels)

Month	1910 to 1914 5 year average	1915 to 1930 16 year average
July	25.0	33.6
August	33.3	47.4
September	42.4	71.0
October	54.8	85.7
November	64.6	93.2
December	72.8	94.7
January	66.7	85.7
February	62.2	78.5
March	58.5	72.2
April	53.7	63.7
May	43.8	52.0
June	34.2	42.4

Table XII shows that the highest coefficients of correlations for visible supply were obtained for the summer and fall months when the crops in North America are being harvested. The highest coefficient is in July and from that time there is a gradual decrease until January, decreasing as the harvesting period draws to a close. Beginning in February the coefficients are small but they gradually increase (with the exception of June) as the beginning of the next crop year approaches.

Contrary to most factors studied, the size of the coefficient is highest during months when the size of the factor is lowest. This is due to the fact that in the beginning of the crop year the visible supply is an important part of the carryover from the previous year and it comes into direct competition with the new crop at a time when the market is trying to establish itself.

Figure 8 shows the relation of points of maximum effectiveness to seasonal price fluctuations on the Kansas City market.

SUMMARY AND CONCLUSIONS

Kansas Production. The coefficients of correlation obtained indicate that the months of maximum effectiveness of Kansas production are August of the summer and fall months,

Table XII.—Relation of the United States visible supply to Kansas City wheat prices.

Month	21 Years	16 Years
July	-.31	-.45
August	-.30	-.45
September	-.22	-.42
October	-.19	-.35
November	-.07	-.25
December	-.08	-.12
January	+.07	-.06
February	-.013	-.18
March	-.07	-.20
April	-.10	-.20
May	-.26	-.38
June	-.19	-.29

and April of the spring months. These conclusions are supported by the following facts: 1. August is the month in which the heaviest marketing of the Kansas crop has occurred during most of the period; and 2. April is the month in which Kansas City receipts of wheat are most frequently the smallest.

The study not only supports the contention that the Kansas crop is most important during the seasonal "weak spot" from June to September, and the seasonal "strong spot" April and May, but also indicates that there is a relation between the size of the crop and the degree of influence on price. A small Kansas crop would tend to make

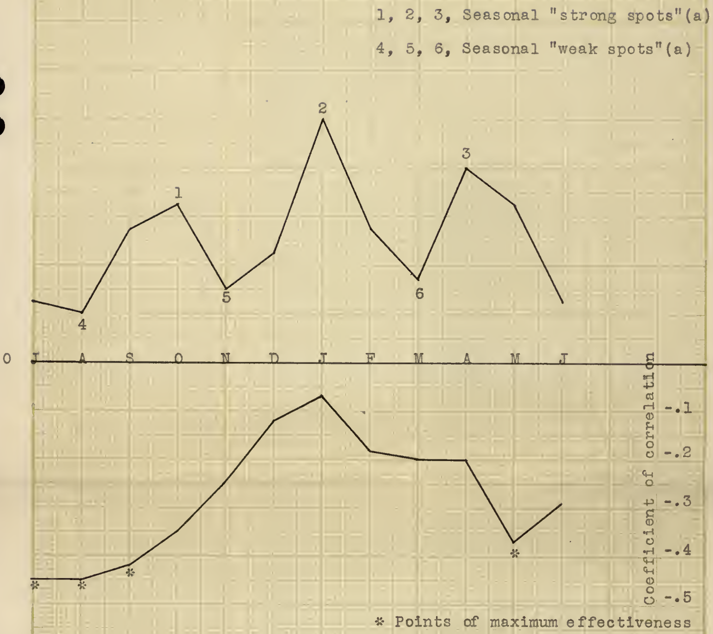

Figure 8.— Seasonal "strong spots" and "weak spots" of the Kansas City market, and points of maximum effectiveness for the United States visible supply.

(a) See Fig. 1, Appendix.

the decline in July and August less and the increase in April and May greater. The reverse is true for a large crop.

The United States Spring Wheat Production. Coefficients of correlation obtained, together with supporting evidence, show that the United States spring wheat crop has its greatest effect in September and May of the corresponding crop years and in July of the following crop year. September corresponds to the period of harvesting and heavy marketing of the spring wheat crop and any decrease or increase in the size of the spring wheat crop tends to check or favor the advance in seasonal prices which usually occurs at that time. The effect in May and the following July must be accounted for by the carryover as May and July are at the ends of the crop year for spring wheat. The size of the coefficients for the other months indicate that the spring wheat crop is a relatively unimportant factor for those months.

Canadian Production. The greatest effect of Canadian production comes in December. December is at the end of the fall period of active marketing and harvesting of the Canadian crop and is also the seasonal low point for Winnipeg prices. Cash wheat goes to a discount under the May future during this month as the closing of the lakes in winter requires storage until spring. The decreased effect in January and April can be accounted for by the decrease in Canadian exports during those months.

The size of the coefficients which vary from -.60 to a -.78 indicates that a small Canadian crop can be expected to be a decidedly favorable factor in checking declines and in favoring price advances, while a large Canadian crop can be expected to have the opposite effect.

Argentine Plus Australian Production. Beginning in November, there is a gradual increase in effectiveness of the Argentine plus Australian crops until a peak is reached in May. This is at least two months later than the peak of marketing and exporting, and comes at a period of the seasonal strong spot in April and May.

The importance of Argentine and Australian production on May prices results from its modifying effect on the size of the increased spring movement of wheat in May. The opening of the Great Lakes starts the movement in Canada and there is a seasonal increase in market receipts in the United States in May.

The coefficients of correlation vary from -.50 in November to -.74 in May, indicating that those crops have been very important in their effect on Kansas City prices.

Canadian Exports. From February to September inclusive, there is little variation in degree of effectiveness of Canadian exports but with a slight tendency to increase. For the year, October is the month in which Canadian exports are most effective. November comes next followed by a rapid decrease from then until the next February, January showing the least. Although October ranks third in total Canadian exports, it is the month when heavy Canadian exports begin to pick up. For the five-year period, 1920-21 to 1925-26, the increase of October over September was 200 per cent but the increase of November over October was only 10 per cent.[9] October is in the period of the seasonal "strong spot," September and October.

Exports From Competing Countries. The combined exports from the countries of Canada, Argentina, Australia, India, and Russia, show relationships to Kansas City prices that are very similar to those of Canadian exports, being highest in October and next highest in November. This is due no doubt to the facts that Canadian exports are included and that the peaks of exports come at the same time as the peaks of the Canadian exports. The months of greatest exports are October, December, and November, ranking in the order named. The increase of October over September is much greater than the increase of any other month over the preceding month and, of course, purchases and sales for

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9. Green, R. M. and Stokdyk, E. A. Judging Price Risks in Marketing Wheat. 1927. P. 7, Fig. 1.

export are made sometime ahead of actual export. The higher correlation in April is due to the increased spring movement of Canadian wheat in April and to the fact that in April there is usually a seasonal increase in European imports.

Wholesale Commodity Prices. The relationship of wholesale commodity prices to Kansas City wheat prices is high, the coefficient of correlations varying from a plus .86 to a plus .94. This difference is slight and is hardly enough in degree to indicate any great difference in points of effectiveness. May has the highest correlation of the months from January to June inclusive and January the least. For the period July to December inclusive, November is highest and August the least. For the 12 months, the period from July to December shows higher correlations then the period from January to July. The high correlations in September, October, and November are influenced by the fact that this is the season of heaviest mill grinding and the general price situation affects the demand for flour and hence, for wheat to be ground. The correlation in May is influenced by a similar situation with respect to spring trade in flour.

Condition Of The Growing Crop. Only two months were studied with this factor. They were May and June. The size of the coefficient in May indicates a relationship and that there is some effect of May 1 condition report on May prices. For June the size of the coefficient is negligible indicating that June 1 condition report is an unimportant factor in determining June prices.

The United States Visible Supply. The United States visible supply seems to have considerable effect from May to October, inclusive, reaching the peak in July and August during the period of the harvesting and marketing of the Kansas crop. From October to April some effect is noticeable but it is much less than for the other months. The fact that the months of greatest effectiveness are the same as the months of most activity in marketing the Kansas crop indicates that the United States visible supply must be seriously considered in determining the effect of a large or small Kansas crop. The visible supply is an important part of the carryover of old wheat and affects the following year's prices especially at the beginning of the crop year. The importance of the visible supply in May is due to its effect on prices as open interest in May futures is being closed out.

General Conclusions. 1. The high plus correlation of commodity prices and wheat prices shows that without much doubt the general price level of wheat is more closely related to the commodity price level than to any other one factor. 2. The greatest seasonal effect as considered by the grain trade comes in most instances at the same time as the effect indicated by the coefficients of correlation. 3. The consistency of the coefficients of correlation in being negative for all production and export factors indicates at least some reliability in measuring the degree of effectiveness by use of coefficients of correlations. 4. Decided shifts in both factor and price may decidedly affect the results obtained and for this reason a short period may be more reliable than for a long period. 5. No single factor can be considered alone for in any given year its effect may be offset by one or more of the others.

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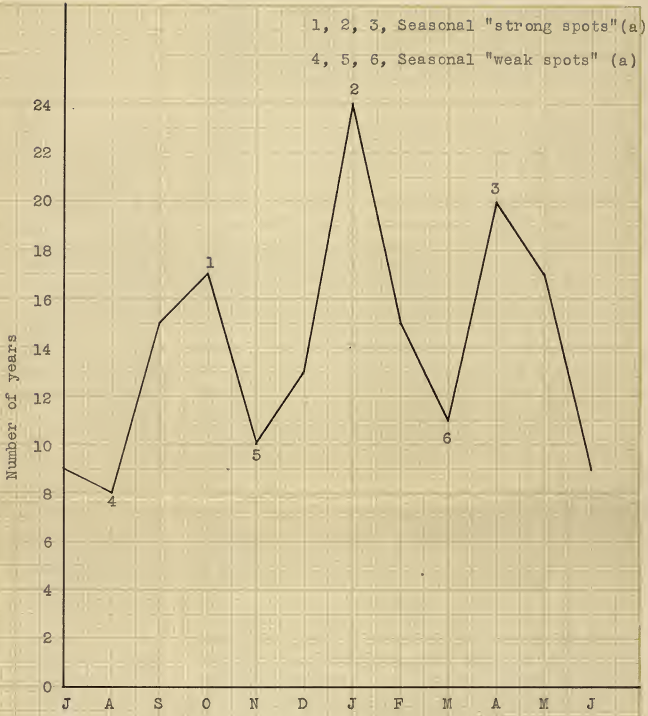

Figure 1.—Number of times that the highest price in any month was higher than the price in the preceding month.(a)

(a) Green, R. M. and Stokdyk, E. A. Judging Price Risks in Marketing Wheat. Ext. Cir. No. 54. Kansas State College of Agriculture and Applied Science.

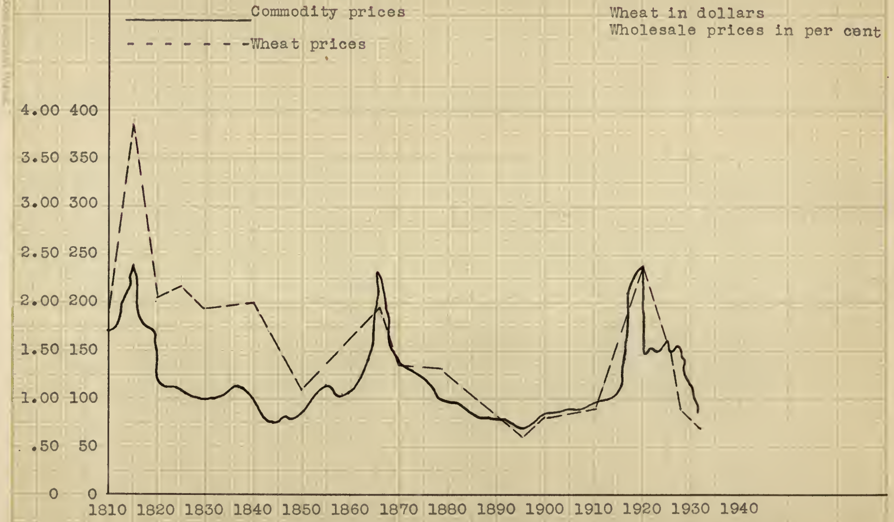

Figure 2.—A comparison of the long-time trends of wheat prices and wholesale commodity prices, 1810-1940. (a)

(a) Warren and Pearson. Agricultural Situation. p. 66.

Table I.—Kansas City monthly high prices.
No. 2 hard (Choice dark hard) wheat.

Year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1909-10	$1.36	$1.13	$1.08	$1.12	$1.02½	$1.15	$1.15	$1.16	$1.14	$1.14	$1.14	$1.06
1910-11	1.11	1.04	1.04	1.03	1.02	1.02	1.03	.98	.97	.96	.98	.95
1911-12	.92½	.98	1.08	1.11	1.07	1.05	1.11	1.11½	1.11	1.15½	1.17	1.15½
1912-13	1.15	.93	.91	.95	.91	.90	.98	.93	.89	.91	.93	.94
1913-14	.90	.87	.91	.90½	.88	.89	.89½	.90½	.91½	.90	.93	1.00
1914-15	.92	1.11	1.16	1.08½	1.10	1.22	1.45	1.61	1.58½	1.58	1.58	1.35
1915-16	1.48	1.45	1.17	1.15	1.10	1.19	1.33	1.32	1.12	1.22	1.17	1.08
1916-17	1.22½	1.56	1.65	1.94	1.93	1.83	1.98	1.94	2.15½	3.15	3.42	3.02
1917-18	2.87	2.90	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
1918-19	2.32	2.19	2.18	2.20	2.24	2.34	2.39	2.32	2.60	2.85	2.81	2.60
1919-20	2.48	2.34	2.55	2.53	2.74	2.88	3.05	2.66	2.70	2.93	3.14	2.99
1920-21	2.92	2.65	2.68	2.26	2.14	1.77	1.85	1.74	1.67	1.48	1.62	1.64
1921-22	1.55	1.28	1.32	1.29	1.20	1.18	1.24	1.47	1.50	1.56	1.58	1.50
1922-23	1.48	1.15	1.13	1.23	1.23	1.25	1.23	1.24	1.23	1.28	1.26	1.17
1923-24	1.07	1.19	1.25	1.28	1.25	1.25	1.23	1.23	1.23	1.24	1.23	1.30
1924-25	1.41	1.35	1.46	1.57	1.61	1.92	2.12	2.08	2.05	1.80	1.78	1.90
1925-26	1.73	1.82	1.71	1.70	1.72	1.90	1.89	1.83	1.71	1.71	1.63	1.71
1926-27	1.47	1.41	1.42½	1.44½	1.42	1.42	1.40	1.39½	1.39	1.37	1.59	1.59
1927-28	1.63	1.70	1.59	1.59	1.58½	1.61½	1.73	1.70	1.81	2.06	2.05	1.85
1928-29	1.60	1.44	1.34	1.32	1.35	1.34	1.37	1.36	1.31	1.32	1.19	1.28
1929-30	1.77	1.54	1.36½	1.35	1.33	1.39	1.37	1.23	1.13	1.13	1.15	1.15
1930-31	.93	.97	.88	.86	.78	.77	.74	.73	.74	.75½	.76	.79

Table II.— Kansas wheat production.
(In millions of bushels)

Year	Production
1910	61
1911	51
1912	89
1913	72
1914	181
1915	96
1916	99
1917	41
1918	93
1919	146
1920	141
1921	128
1922	116
1923	76
1924	153
1925	74
1926	150
1927	111
1928	178
1929	139
1930	159

Table III.—United States spring wheat production.
(In millions of bushels)

Year	Production
1910	201
1911	191
1912	330
1913	240
1914	206
1915	352
1916	156
1917	224
1918	356
1919	208
1920	222
1921	215
1922	281
1923	226
1924	272
1925	275
1926	204
1927	326
1928	336
1929	233
1930	247

Table IV.— Canadian Wheat production.
(In millions of bushels)

Year	Production
1910	132
1911	231
1912	224
1913	232
1914	161
1915	394
1916	263
1917	234
1918	189
1919	193
1920	263
1921	301
1922	400
1923	474
1924	262
1925	395
1926	407
1927	480
1928	567
1929	305
1930	396

Table V.— Argentine wheat production.
(In millions of bushels)

Year	Production
1910	146
1911	166
1912	187.4
1913	105
1914	169
1915	169
1916	80
1917	223.6
1918	180.2
1919	217
1920	156
1921	191
1922	189
1923	248.7
1924	190
1925	191
1926	221
1927	239
1928	307.4
1929	137.4
1930	271

Table VI.— Australian wheat production.
(In millions of bushels)

Year	Production
1910	95
1911	72
1912	92
1913	103.3
1914	25
1915	179
1916	152.4
1917	115
1918	76
1919	46
1920	146
1921	129
1922	109
1923	125
1924	164
1925	114
1926	161
1927	118
1928	160
1929	126
1930	215

Table VII.—Canadian exports.
(In thousands of bushels)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1909	6,370	2,160	2,084	2,824	1,919	2,766	2,486	1,244	1,837	5,009	8,551	16,160
1910	2,081	1,695	1,841	3,431	3,372	4,010	2,065	918	2,365	7,457	9,493	6,370
1911	2,373	1,481	2,748	1,968	7,188	4,378	1,984	4,574	2,944	5,266	14,316	15,936
1912	2,653	3,451	4,485	3,169	13,676	6,780	6,212	4,715	2,877	6,157	15,936	15,119
1913	3,826	3,337	12,526	8,270	9,087	8,766	6,059	7,069	5,076	23,005	22,208	21,796
1914	3,172	2,261	2,897	3,875	8,166	5,231	9,357	3,834	3,122	9,631	11,681	6,339
1915	5,004	3,092	4,329	4,039	5,001	6,604	2,982	2,310	6,135	32,117	43,069	38,37[illegible]
1916	7,538	4,173	7,255	14,550	31,176	24,512	26,291	21,148	10,775	12,257	15,170	19,682
1917	4,501	2,247	5,074	2,123	20,544	18,317	6,182	13,956	2,175	14,302	24,901	29,522
1918	5,682	5,106	8,767	5,939	4,371	3,339	1,742	1,006	1,799	5,911	4,525	8,007
1919	10,554	2,123	4,035	3,874	10,190	7,210	8,248	4,291	2,164	3,796	8,605	7,640
1920	11,446	6,552	4,852	1,825	2,296	4,944	5,929	4,767	3,926	16,547	26,134	34,734
1921	6,103	9,181	7,486	4,983	8,112	6,003	3,649	3,972	7,145	21,130	29,254	34,492
1922	9,739	5,602	6,042	1,740	14,207	11,760	9,487	11,587	9,233	37,593	55,316	40,669
1923	12,322	7,129	6,614	5,143	11,931	22,229	12,665	11,419	5,299	29,070	64,197	57,378
1924	6,103	11,770	13,446	6,085	41,228	24,075	16,135	8,199	10,268	14,288	26,982	29,897
1925	13,199	4,146	4,422	4,953	14,883	9,784	13,097	15,336	15,876	41,896	34,840	57,008
1926	12,571	14,074	14,734	5,525	18,971	27,792	16,306	9,541	10,575	30,573	43,947	44,879
1927	15,201	11,421	16,395	20,182	20,698	15,863	6,620	12,197	14,071	19,430	52,805	44,809
1928	20,831	18,371	18,655	8,361	30,282	29,960	32,426	25,057	26,923	43,687	75,416	49,089
1929	4,994	15,220	21,207	7,313	27,073	25,537	17,019	10,156	7,410	20,722	22,445	15,961
1930	7,190	6,732	11,592	3,428	13,467	18,989	19,868	20,000	31,000	33,000	34,700	24,900

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Table VIII.— Exports of wheat from Argentina.
(In thousands of bushels)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1909	7.6	23.5	20.5	20.4	7.6	10.0	6.0	2.2	3.3	0.8	1.0	1.0
1910	1.7	12.0	10.8	13.0	5.0	4.2	5.0	5.1	4.7	3.6	4.0	4.0
1911	6.5	10.6	13.6	9.5	10.0	9.0	7.0	6.0	3.6	3.0	2.0	1.0
1912	0.8	5.4	15.4	12.0	15.0	11.4	9.0	5.0	4.8	4.0	4.0	3.0
1913	10.0	19.3	25.0	19.0	11.0	5.0	2.6	2.6	2.0	1.3	1.0	1.3
1914	3.1	8.8	6.7	3.9	4.0	3.6	1.8	1.0	0.7	0.1	0.2	0.7
1915	2.3	11.5	20.8	19.1	17.4	10.0	2.5	2.0	1.2	0.8	0.7	0.8
1916	1.7	8.0	12.5	9.0	8.3	7.0	5.7	3.2	3.6	7.0	4.3	8.2
1917	7.0	6.5	7.0	2.3	3.6	1.0	0.6	0.5	0.7	0.6	1.8	1.7
1918	2.4	3.0	8.4	14.0	10.6	17.0	23.0	16.0	5.4	4.0	2.3	2.8
1919	3.4	2.7	3.7	2.0	6.0	10.0	14.0	17.0	13.0	10.0	12.4	19.0
1920	19.0	19.0	22.0	32.0	34.6	27.0	22.6	5.0	2.5	0.8	0.1	2.0
1921	1.7	6.6	7.8	13.0	9.0	7.5	5.6	2.0	1.3	0.9	0.6	3.0
1922	9.3	20.3	20.0	28.5	14.0	12.8	14.8	9.0	4.5	5.2	7.3	5.6
1923	12.0	18.2	17.8	17.0	15.6	14.5	8.8	9.5	9.7	6.2	4.2	2.3
1924	12.5	22.5	25.0	25.6	18.0	19.7	11.7	8.5	5.2	6.0	3.8	7.1
1925	6.0	21.5	16.4	11.6	6.6	6.7	5.8	6.0	4.0	5.2	4.7	4.3
1926	14.0	12.0	12.8	15.8	10.0	8.0	4.4	2.6	2.0	2.8	2.3	3.8
1927	24.0	22.4	27.0	24.0	18.7	13.3	9.8	5.9	5.4	5.3	5.0	8.5
1928	22.4	29.6	30.3	22.5	15.0	16.5	10.0	6.4	8.3	12.0	12.7	16.0
1929	12.6	27.3	29.6	25.3	24.5	23.0	14.4	23.7	24.5	15.2	8.3	11.2
1930	12.0	11.5	10.0	11.0	7.6	12.0	2.6	3.7	2.9	5.0	2.8	5.0

Table IX.— Australian exports.
(In thousands of bushels)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1909	8.0	7.0	6.0	3.7	1.4	0.4	0.5	0.5	0.9	0.7	0.4	2.0
1910	11.0	8.6	8.7	4.6	2.5	0.8	1.4	1.8	3.8	2.2	1.6	1.7
1911	6.0	7.7	8.0	7.4	3.4	3.0	3.1	3.4	3.6	3.5	3.0	2.8
1912	6.0	6.6	4.7	4.3	1.7	1.5	0.7	2.2	1.0	1.6	1.3	0.7
1913	6.0	7.3	6.3	5.0	3.7	2.7	2.8	2.0	2.1	1.2	1.5	2.3
1914	11.0	10.0	11.6	6.0	5.4	4.7	2.3	0.8	0.4	0.4	0.1	0.01
1915	.1	--	.01	--	--	--	--	--	--	--	0.1	1.0
1916	3.8	3.4	4.4	6.1	6.4	3.4	2.5	2.4	3.0	2.8	1.8	4.0
1917	7.4	9.0	12.3	4.6	3.0	2.4	1.7	2.8	0.8	1.8	1.4	1.5
1918	1.2	2.4	3.0	2.4	1.9	1.9	1.1	1.3	1.5	2.2	1.4	1.3
1919	1.7	4.4	8.7	6.9	8.4	5.5	9.5	4.8	9.8	9.0	6.9	5.2
1920	10.7	6.7	5.5	5.1	5.0	3.7	0.9	1.2	1.8	2.7	1.3	1.1
1921	8.0	10.0	10.0	13.4	14.0	10.0	4.6	4.3	3.8	9.0	8.5	6.5
1922	12.7	13.3	13.0	12.0	8.0	4.4	2.0	1.0	0.9	0.1	0.02	1.0
1923	6.5	4.1	6.4	4.6	3.0	1.6	2.0	2.1	3.7	1.7	1.7	2.4
1924	14.0	13.0	9.7	8.6	9.4	5.5	4.7	5.5	3.0	3.6	2.0	3.6
1925	14.0	21.6	20.0	19.0	15.0	9.0	3.7	4.1	4.1	2.0	1.7	2.5
1926	15.0	14.0	8.0	6.0	7.0	16.0	3.5	2.0	1.5	1.4	1.4	6.0
1927	9.0	14.0	15.0	12.0	13.0	10.0	8.0	4.0	4.0	2.2	1.5	2.2
1928	22.6	6.2	9.0	8.0	9.0	4.8	4.6	4.7	2.3	5.0	4.0	7.7
1929	8.9	16.0	15.0	12.0	8.0	5.0	5.0	5.0	4.0	2.3	1.8	4.7
1930	6.6	7.9	9.4	4.5	7.0	5.0	4.3	6.0	4.4	7.0	6.5	7.6

Table X.— India exports.
(In thousands of bushels)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1909	.03	.02	.04	.7	3.5	8.7	10.3	6.5	.8	1.4	1.3	1.2
1910	1.7	11.8	10.8	9.6	5.0	4.2	4.8	5.1	4.7	3.6	4.0	3.7
1911	4.2	3.5	3.8	2.5	5.0	7.0	10.0	4.7	2.4	2.4	2.7	3.6
1912	3.8	2.8	3.6	2.6	4.0	9.0	12.2	5.7	8.6	5.5	4.2	3.0
1913	3.7	2.0	1.3	1.0	6.2	9.7	12.0	5.0	5.0	2.0	1.7	.8
1914	.8	.3	.3	.3	.9	6.3	6.3	1.6	2.0	3.3	2.0	1.4
1915	.9	.8	.3	.4	3.9	10.9	7.0	1.8	.2	.01	.009	.01
1916	.017	.07	.03	.1	.07	1.5	1.6	2.8	5.2	5.6	3.0	3.7
1917	2.0	.5	1.9	3.5	7.8	6.1	10.4	5.7	5.7	6.1	2.6	2.0
1918	.7	.6	3.0	2.0	2.4	2.8	2.8	4.7	1.7	.6	.3	.1
1919	.05	.02	.02	.008	.04	.02	.02	.03	.03	.03	.01	.03
1920	.03	.03	.03	.021	.05	.03	.03	.02	.03	.03	.3	1.3
1921	3.0	2.0	2.0	.6	.4	.5	.9	.2	.01	.03	.3	1.3
1922	.02	.003	.01	.007	.01	.009	.005	.009	.008	.02	.01	.007
1923	2.3	1.0	.7	2.0	3.3	7.6	5.2	1.6	1.3	.03	1.7	2.1
1924	.05	.02	.04	.002	.5	4.4	7.1	2.8	1.3	.40	1.0	.6
1925	4.0	6.0	3.0	.3	.8	3.4	.6	.7	.8	4.7	4.2	3.2
1926	.3	.06	.04	.02	.1	1.4	2.0	1.0	.1	.02	.2	.1
1927	.3	.05	.02	.01	.06	2.8	4.8	1.4	.6	.5	.6	.2
1928	.04	.03	.04	.2	.4	2.3	.9	.2	.03	.6	.5	.07
1929	.05	.02	.01	.01	.01	.07	.1	.2	.08	.03	.01	.01
1930	.8	.58	1.21	.01	.03	1.57	2.4	1.7	.7	.14	.3	.3

Table XI.—Russian exports.
(In thousands of bushels)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1909	4.6	5.0	4.6	14.4	16.8	9.7	9.7	19.6	30.0	32.5	22.6	18.5
1910	14.0	13.7	17.5	19.5	15.8	14.4	13.0	23.0	28.6	25.6	23.0	16.0
1911	11.7	11.7	13.6	19.7	23.5	17.0	9.4	8.0	5.7	9.8	8.5	5.8
1912	2.8	5.0	5.0	5.4	6.0	9.3	6.5	12.8	16.7	12.5	9.2	5.4
1913	3.7	4.1	5.2	9.8	9.3	5.4	5.8	14.0	20.0	17.3	16.0	10.7
1914	10.4	10.1	14.0	14.5	18.3	12.5	.7	.04	.1	.2	.1	.03
1915	.007	.02	.08	.004	.3	.6	1.4	1.8	1.1	.7	.3	.1
1916	.003	.008	.005	.3	.03	1.4	2.1	2.2	1.2	.9	.1	.06
1917	.05	--	.02	--	.02	.1	.2	--	--	--	--	--
1918	--	--	--	--	--	--	--	--	--	--	--	--
1919	--	--	--	--	--	--	--	--	--	--	--	--
1920	--	--	--	--	--	--	--	--	--	--	--	--
1921	--	--	--	--	--	--	--	--	--	--	--	--
1922	--	--	--	--	--	--	--	--	--	--	--	--
1923	--	--	--	--	--	--	--	--	--	--	--	--
1924	--	--	--	--	--	--	--	.02	.3	--	--	--
1925	--	--	--	--	--	--	--	--	4.0	5.0	2.0	.7
1926	.8	1.0	1.0	1.0	3.0	2.0	.4	1.0	--	--	--	--
1927	--	--	--	--	--	--	--	--	--	--	--	--
1928	--	--	--	--	--	--	--	--	--	--	--	--
1929	--	--	--	--	--	--	--	--	--	--	--	--
1930	--	--	--	--	--	--	--	--	--	--	--	--

Table XII.— Index of wholesale commodity prices.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1910	104	104	106	107	105	104	104	103	102	99	97	97
1911	97	94	95	92	92	92	93	96	97	97	96	95
1912	96	97	99	102	102	101	101	102	103	103	103	102
1913	103	102	102	102	101	101	102	102	103	103	102	101
1914	100	100	99	99	98	98	99	101	103	99	99	98
1915	99	100	100	100	101	100	101	100	100	103	105	108
1916	112	115	117	119	121	121	122	134	127	133	142	145
1917	149	153	157	167	176	178	180	182	180	178	179	180
1918	183	179	185	187	187	188	193	196	201	199	199	199
1919	196	190	192	194	198	198	206	211	206	207	211	220
1920	230	229	232	242	244	243	242	236	227	211	195	176
1921	167	153	150	144	141	136	136	137	136	137	138	136
1922	134	136	136	136	140	141	145	144	145	145	147	147
1923	149	151	153	152	149	147	144	143	146	146	144	143
1924	145	146	144	142	140	139	140	142	142	143	145	148
1925	150	152	152	149	148	150	152	152	151	151	153	151
1926	151	149	147	146	147	147	145	145	146	145	144	143
1927	141	140	138	137	137	137	137	139	141	142	141	141
1928	141	141	140	142	144	143	144	144	146	143	141	141
1929	142	141	142	141	140	141	143	143	142	141	138	138
1930	136	135	133	132	130	127	123	123	123	121	117	115

Table XIII.— The United States visible supply.
(In thousands of bushels)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1910	38.0	36.6	34.5	37.0	33.8	24.8	16.4	17.0	38.4	48.4	53.4	57.0
1911	59.4	56.4	50.6	42.7	34.6	32.8	29.6	46.0	54.6	61.5	74.0	81.0
1912	81.5	71.0	67.0	59.8	48.0	36.0	27.6	23.6	27.0	41.0	52.5	67.6
1913	77.5	76.0	74.0	69.0	53.5	43.7	34.4	43.2	52.0	61.5	66.7	72.0
1914	75.0	71.0	66.2	60.0	49.3	33.6	17.1	36.5	40.0	61.8	76.3	86.3
1915	86.0	82.0	59.0	46.0	31.4	22.9	10.7	9.4	12.7	22.5	33.3	60.7
1916	80.0	78.0	74.0	66.7	57.6	52.5	50.5	50.0	65.7	70.4	75.4	76.2
1917	73.6	59.5	54.2	48.5	32.8	34.9	20.0	11.7	10.3	13.1	22.9	29.6
1918	26.5	20.4	15.5	10.0	6.7	4.3	2.5	20.5	54.2	98.0	132.0	132.0
1919	130.0	140.6	127.0	100.5	55.2	27.6	10.9	26.0	65.5	96.0	108.0	101.0
1920	85.0	68.5	58.6	52.0	44.7	41.2	23.4	20.2	24.2	32.2	41.6	48.3
1921	47.8	38.5	32.0	22.0	17.6	10.6	10.0	28.7	47.2	63.0	62.8	53.5
1922	56.8	49.0	46.7	42.0	36.6	31.5	20.3	23.0	32.5	38.0	39.0	39.7
1923	43.9	54.0	54.6	52.0	49.5	37.2	29.4	40.5	64.0	73.0	79.0	82.0
1924	84.0	75.0	73.0	66.7	50.4	48.7	38.6	46.2	80.0	92.0	101.0	109.0
1925	99.0	84.5	76.4	62.8	49.5	38.3	29.3	34.0	40.0	56.6	52.4	52.7
1926	59.2	52.7	48.0	38.0	33.8	23.2	16.5	34.6	73.0	85.0	81.2	79.0
1927	71.0	62.3	61.3	53.0	42.4	31.1	25.5	37.5	72.0	89.0	99.0	100.0
1928	94.0	84.0	78.0	73.0	66.2	52.5	42.2	66.8	97.0	118.0	143.0	145.0
1929	147.0	134.0	130.0	128.0	116.6	100.0	95.7	145.0	197.0	206.0	209.0	199.0
1930	188.0	173.0	165.0	158.0	140.3	123.0	112.8	165.0	201.0	219.0	212.0	207.0

Table XIV.—Condition of growing crops.

Year	May	June
1910	80.8	80.0
1911	33.3	80.4
1912	80.6	74.3
1913	91.6	83.5
1914	95.6	92.7
1915	88.8	85.8
1916	78.3	73.2
1917	63.4	70.9
1918	78.6	83.8
1919	99.8	94.9
1920	75.6	78.2
1921	91.0	77.9
1922	78.4	81.9
1923	75.2	76.3
1924	83.0	74.0
1925	77.0	66.5
1926	84.0	76.5
1927	85.6	72.2
1928	74.9	73.6
1929	83.6	79.6
1930	76.7	71.7

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